CHAPTER 2

2 OPTIONS ANALYSIS

This chapter discusses the project options that have been considered by FGMI in preparing its applications for various state and federal permits. Options analysis involves many factors, including engineering feasibility, environmental concerns, and construction and operating costs.

Four sections comprise this chapter. Section 2.1 identifies and describes the criteria used to evaluate options. Section 2.2 determines the options to be considered to determine whether the project would "significantly affect the human environment." The section discusses how options were screened and evaluated, and how the preferred options were selected. Section 2.3 presents the details of the applicant's proposed project. Finally, Section 2.4 addresses the no-action alternative.

In reviewing this chapter, the reader should understand the relationship among the terms "component," and "option." A complete mining project, such as the proposed True North, has several *components*, each a necessary part of an entire viable project; for example, the mine, location of development rock stockpiles, or the access haul route. For each component, there may be one or more *options*, or choices; for example, the specific access route for hauling ore to the Fort Knox Mill. The term “alternative” is used in the discussion for the access haul road route component, rather than “option,” because it had already gained wide use in this project. In this regard then, “alternative” is used as a synonym for “option.”

2.1 OPTIONS EVALUATION CRITERIA

The True North project would consist of several components, including the open pit mine, development rock dumps, ore stockpile, growth medium stockpiles, access haulage, processing method, maintenance complex, power supply, water supply, and general infrastructure including access roads. Some components have only one logical option (for example, location of the mine pit is determined by the location of the ore body), while others (such as location for development rock and growth medium stockpiles) have more than one option. To determine which array of options would constitute the best entire project, it was necessary to identify a set of criteria to use in evaluating the options.

The development of the criteria was based largely on certain planning and design conditions primarily dictated by the size, nature, and location of the ore body, site topography, environmental considerations, and economics. The major criteria identified for options analysis were as follows:

Project life	Current projection 2.5 to 3 years (based on reserves in Hindenburg and East pits)
Work force requirements	100 to 110 employees. No living accommodations on site. No cafeteria.
Operating period	24 hours per day, 365 days per year
Mining method	Open pit
Production rate	An average of 3.5 million tons of ore per year produced at a rate of approximately 10,000 tpd
Development rock	Approximately 20,000 tpd. Strip ratio 2:1
Development rock stockpiles	16 Million tons
Ore stockpile	100,000 tons
Growth medium stockpiles	350,000 cy. (All material suitable for establishing a viable vegetative cover consistent with the designated post-mining land use)
Electrical requirement	480 V, three-phase power
Fuel storage capacity	Diesel — 20,000 gallons Heating oil — 10,000 gallons Used oil — 10,000 gallons Unleaded gasoline — 14,000 gallons Propane — 2 tanks @ 100 lbs.

Water supply	Approximately 500 to 600 gpd
Access roads	Mine access road -- 100-foot ROW (50-feet either side of centerline) Mine haul road -- 80-foot ROW Exploration access road -- 30-foot ROW
Environmental constraints	Ability to meet all federal, state, and municipal permitting requirements

In addition to these options evaluation criteria, other specific criteria were developed for analyzing individual component options, such as processing method and access route. The criteria are discussed in greater detail below.

2.2 OPTIONS IDENTIFICATION AND EVALUATION PROCESS

Identifying and evaluating options is a process of linking feasible and logical component options into a complete project. Further, by determining the significance of the environmental impacts of the options, the best combination of options can be identified for a complete project.

The first step in the process is to identify the major components necessary for a complete project. For the True North project the major components for which reasonable options may be identified are different than those for most Alaska mining projects because True North is located near existing infrastructure and potentially conflicting land uses. Six components often considered major for mining projects thus were not judged to be major for the True North project. These were mining method; location of development rock, overburden, ore, and growth medium stockpiles; maintenance complex location; power supply; water supply; and employee housing. These are discussed below.

Mining method -- The mining method identified was open pit, as opposed to underground mining, because of the nature of the ore body. The ore is at or near the surface, and its fractured nature would make the shoring up required for underground mining a difficult and costly process. Gold is scattered randomly throughout the ore body rather than concentrated in thick veins conducive to underground mining. Therefore, underground mining was not considered a feasible option.

Development rock, overburden, ore, and growth medium stockpiles -- Because of the location of the ore body high on a ridge, there would be adequate room for these stockpiles close to the pits. No creeks would be blocked, and only lower value wildlife habitat and wetlands would be affected. No other reasonable environmental or economic options were identified.

Maintenance complex -- In a similar vein to the stockpiles locations, a maintenance complex sited just south of the pits adjacent to the existing access road did not appear to have other reasonable environmental or economic options.

Power supply -- With a spur of the existing GVEA power grid located approximately 2 miles from the mine site atop Pedro Dome, and with the ability to site a powerline to the mine site close to a road right of way (ROW), on-site power generation did not make environmental or economic sense.

Water supply -- With the limited need for water, and no nearby surface water supply, drilling a well made more environmental or economic sense than damming a more distant creek and installing a pipeline and pumping system.

Employee housing -- With existing road access and a location near the population center of Fairbanks, onsite employee housing did not make environmental or economic sense.

Fixed by the location of the ore body, the mine site itself could not have any options.

Because of the technical, environmental, and economic advantages of the six component options discussed above, they were selected as the preferred options.

Five major True North project components were identified, however, for which reasonable competing options exist. These were ore processing and siting; ore transfer method; ore transfer routing; Steese Highway crossing; and hours of access hauling operation. Options identification for these five major components, and evaluation of these options, are discussed below.

2.2.1 OPTIONS IDENTIFICATION AND EVALUATION

After the five major components were identified, individual options for those components were identified and analyzed in an evaluation process to eliminate unfeasible or illogical options, to investigate in greater detail when more than one feasible and logical option existed, and to select a preferred option. Following is a description that process.

2.2.1.1. PROCESSING AND SITING

Three options for processing True North ore were considered.

- On site heap leach
- On-site stand-alone mill
- Off-site mill

On-Site Heap Leach -- Constructing a stand-alone cyanide heap leach facility would require significant additional acreage and surface disturbance for ore crushing and construction of leach pads, solution ponds, and recovery facilities for the approximately 7.2 million tons of processed ore. The solution ponds would contain sodium cyanide which is essential to the heap leach process. Large quantities of water would be required. Water would have to be obtained from water wells or water storage impoundments and pumping facilities built in surrounding drainages. Visual impacts would be increased because of the solution ponds as well as creation of large mounds of stacked ore on the heaps. There would be an overall increase of traffic from Fairbanks to the Cleary Summit area because of the additional process employees needed on site and the shipment of reagents.

On-Site Stand Alone Mill -- Construction of a conventional stand-alone cyanide vat leach mill would require additional surface disturbance for the mill buildings, leach tanks, reagent storage areas, stockpile areas, and ore crushing and support facilities. A mill would require construction of both a fresh water supply dam and a separate tailing disposal impoundment for the approximately

7.2 million tons of processed ore. Large quantities of water would be required from water wells or year-round water storage impoundments and pumping facilities built in surrounding drainages. There would be an overall increase of traffic from Fairbanks to the Cleary Summit area because of the additional mill employees needed on site and the shipment of reagents.

Off-Site Mill -- A conventional cyanide vat leach mill facility exists at the Fort Knox Mine within approximately 12.5 road miles of the True North ore deposit. This option would require no processing component at the True North Mine site. Ore would be trucked to the Fort Knox Mill for processing. The ore would be treated and tailings material deposited within an existing zero discharge facility. No additional disturbance would be necessary on the True North Mine site to accommodate a mill and ancillary facilities. No additional disturbance would be required in the surrounding drainages for development of a water supply system and tailings storage, thus minimizing the potential impacts to surface and groundwater.

EVALUATION - EVALUATION OF THE THREE OPTIONS indicated that both the heap leach and vat leach mill options would require development of significant on-site infrastructure while the Fort Knox Mill option would cause the fewest on-site impacts and make best use of nearby existing permitted facilities. The latter option, however, raised its own major issue of ore transfer to the Fort Knox Mill. While this ore transfer issue would cause impacts because of nearby conflicting land uses, many of these impacts could be mitigated. From overall environmental and economic perspectives, therefore, the Fort Knox Mill appeared the most favorable and was selected as FGMI's preferred option for the ore processing and siting component.

2.2.1.2. ORE TRANSFER METHOD

Four options for transferring ore from the True North Mine site to the Fort Knox Mill were considered.

- Off-Highway Trucks
- Over-Highway Trucks
- Conveyor
- Railroad

Off-Highway Trucks -- Off highway trucks, between 85 and 100 tons, could carry large volumes of ore and therefore would decrease the number of trips necessary to move the required tonnage. Off highway trucks would have several disadvantages, however. Their large size relative to other traffic expected to share the same roads would create a safety hazard because ore trucks would be required to cross the Steese Highway. Off-highway trucks also would be louder, causing greater noise impacts to existing residences.

Over-Highway Trucks -- By carefully specifying the design for over-highway tractor-trailers specifically for the True North project, it is possible to increase payloads above those of conventional over-highway trucks. While the 60- to 70-ton payloads would still be less than for off-highway trucks (85 to 100 tons), this design would reduce the number of round trips required on a daily basis. Because these would be more conventional trucks, safety concerns for other road traffic would be substantially reduced. Also, over-highway trucks would be quieter, thus reducing noise impacts to existing residences.

Conveyor -- Practical experience over four years of operation of a relatively short conveyor system at the Fort Knox Mine indicates this would be a less than viable option. A conveyor from the True North Mine to the Fort Knox Mill would need to be approximately 12 miles long and traverse varying topography. In addition, a conveyor would have to bridge the Steese Highway. Operation of long conveyors at low temperatures is very difficult at best. Multiple transfer points would be required with attendant motor drive units, bag houses to capture fugitive dust emissions, and the ever-pervasive spillage of material would add to the already significant problems associated with operating a conveyor in this environment.

Constant, background noise from the carrier rollers likely would be a source of concern at existing residences. A conveyor likely would become an attractive nuisance, thereby becoming a safety concern and liability to the company. At 12 miles in length, over varying topography, there would be no practical way of preventing pedestrians, hikers, bikers, snowmachiners or just curious tourists from climbing in, on, and under the conveyor structure, risking being caught in the moving machinery. The conveyor also could present problems by inhibiting terrestrial wildlife movements across its route.

Railroad -- A railroad option would be every expensive to construct and operate with no significant advantages. Railroads are efficient at moving large volumes over long distances. The small scale of the True North Project, 2.5 to 3 years at only 10,000 tpd, simply could not support the capital investment and operating cost of a rail transportation system. The costs and logistical problems of dealing with a rail system not connected to an existing rail center (e.g., the Alaska Railroad in Fairbanks) would be very substantial. The maintenance facility (locomotive and ore cars), switch yard, ore loading and unloading facilities, roadbed maintenance crews, and transfer facilities for equipment would require additional land and a large capital investment.

Railroads by their nature have severe grade limitations. The grades between the True North Mine and the Fort Knox Mill would require that a longer right-of-way be disturbed. Trains would be noisy and still require lights at night. The Steese Highway would still have too be crossed. If crossed at grade level, warning lights, whistles, and gates would be required, with a substantially longer period of time to clear the crossing then would trucks. The cost off constructing a train tunnel or bridge for this option would be considerably higher than for trucks.

An improved road, likely the existing Pedro Dome / True North Road, would still be required for access to the True North Mine by employees, and for supply of parts, fuel, ammonium nitrate, etc. because such items could not be transferred easily to rail cars.

Evaluation - Evaluation of the four options indicated that trucking ore to the Fort Mill appeared to be the most environmentally sound and economic method. Past experience with operation of a conveyor system at Fort Knox, the necessity for a 12-mile long conveyor, likely problems with fugitive emissions, spillage, constant noise, and trespass all mitigated against the conveyor option. Of the two trucking options, using specially designed highway trucks that could still carry substantial payloads, but which would be quieter and have fewer safety concerns, appeared superior to using larger off highway trucks. The project simply could not support the train option, which would be logistically complicated and provide no significant advantages over trucking. Thus, moving ore by over highway trucks was selected as FGMI's preferred option.

2.2.1.3. ORE TRANSPORT ROUTE

Eight route alternatives were considered for trucking ore from the True North Mine to the Fort Knox Mill (Fig. 2.2-1). Several of these were considered on the basis of public comment and suggestions. These routes are described below, with an analysis or each alternative. Table 2.2-2 contains the route lengths and route estimated costs assuming a grade level crossing of the Steese Highway.

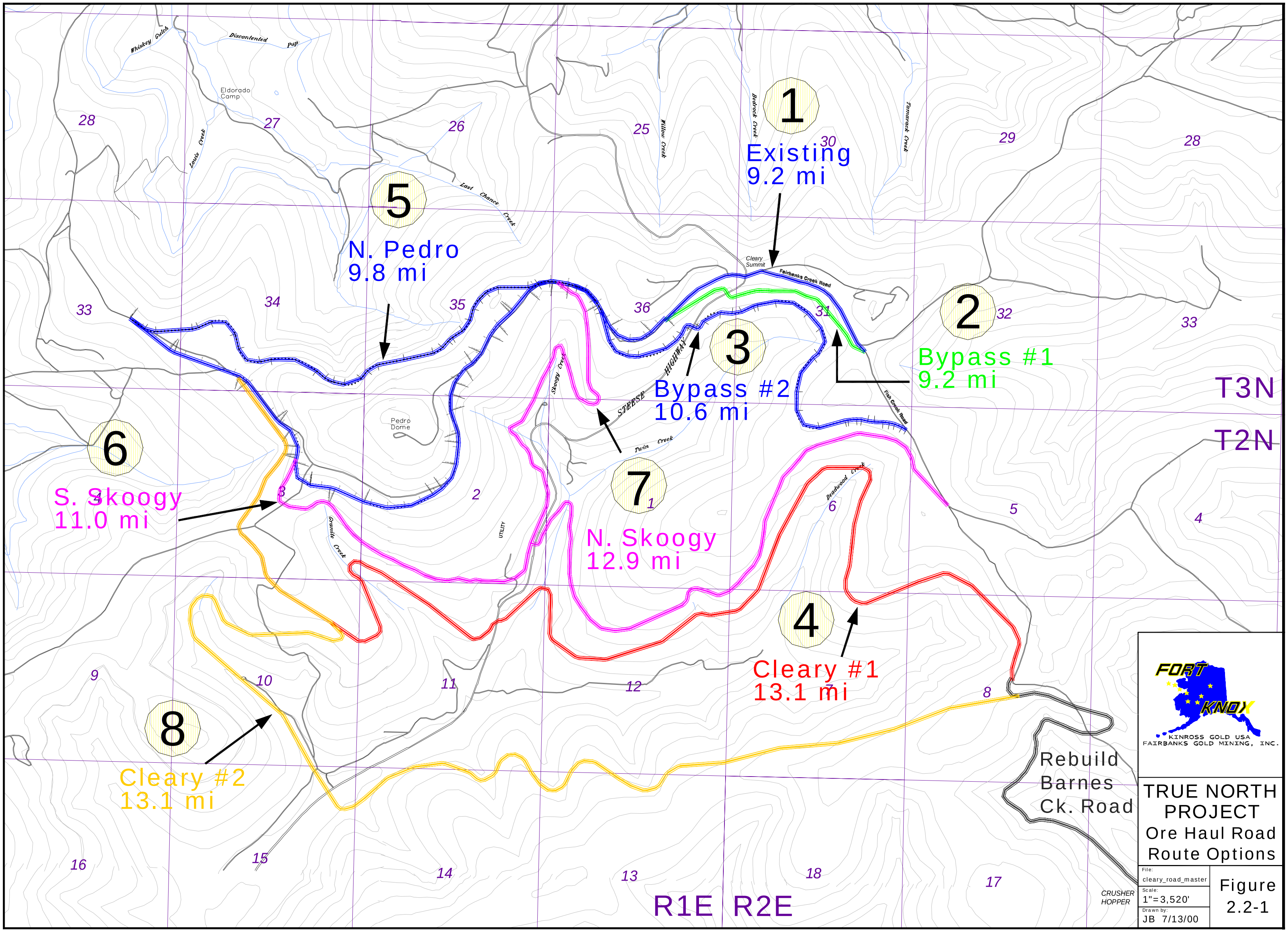

1
Existing
9.2 mi
2
Bypass #1
9.2 mi
3
Bypass #2
10.6 mi
4
Cleary #1
13.1 mi
5
N. Pedro
9.8 mi
6
S. Skoogy
11.0 mi
7
N. Skoogy
12.9 mi
8
Cleary #2
13.1 mi
Rebuild
Barnes
Ck. Road
T3N
T2N
R1E
R2E
Cleary Summit
Fairbanks Creek Road
Fish Creek Road
STEESE HIGHWAY
Pedro Dome
Eldorado Camp
CRUSHER HOPPER
FORT KNOX
KINROSS GOLD USA
FAIRBANKS GOLD MINING, INC.
TRUE NORTH
PROJECT
Ore Haul Road
Route Options
File: cleary_road_master
Scale: 1"=3,520'
Drawn by: JB 7/13/00
Figure
2.2-1

Table 2.2-2 Alternative route lengths and approximate costs		
Alternative	**Length**	**Approximate Cost**
1	9.2	13.1
2	9.2	14.5
3	10.6	16.3
4	13.1	20.8
5	9.8	15.3
6	11.0	17.8
7	12.9	20.8
8	13.1	20.8

Some suggestions by the public for other routes were reviewed and dropped without further consideration because they either were clearly impractical from environmental or economic perspectives, raised more issues than they solved, or were simply impractical. Examples include a tunnel all the way from the True North Mine to the Fort Knox Mill, and a road linking the True North Mine to the Elliott Highway.

Alternative 1 -- South Pedro Dome Route / Fairbanks Creek Road / Fish Creek Road / Barnes Creek Road (9.2 miles)

This alternative follows the existing south Pedro Dome route on the Pedro Dome / True North Road, and then Fairbanks Creek, Fish Creek, and Barnes Creek roads, and uses the existing Steese Highway and Fairbanks Creek Road intersection at the top of Cleary Summit.

Alternative 2 -- South Pedro Dome Route / Bypass # 1 / Fish Creek and Barnes Creek roads (9.2 miles)

This alternative is the same as Alternative 1, except a bypass below Fairbanks Creek Road near the Skiland residences would be used. This option would follow the same route as Alternative 1 along the existing Pedro Dome / True North Road on the south side of Pedro Dome, leaving it on the southeast side of the ridgeline south of the existing Cleary Summit Subdivision just west of Cleary Summit, and would descend eastward to a new intersection with the Steese Highway approximately 792 feet southwest of its existing intersection with the Pedro Dome / True North Road at the top of Cleary Summit. This would be a 90 degree intersection in a straight section of the Steese. The road then would contour the hillside on the east side of the Steese for a distance of approximately 500 feet and then climb at a six percent grade to intersect Fish Creek Road near its present intersection with Fairbanks Creek Road.

Alternative 3 -- South Pedro Dome Route / Bypass # 2 / Fish Creek and Barnes Creek roads (10.6 miles)

This alternative would follow the same route as Alternative 1 along the existing Pedro Dome / True North Road on the south side of Pedro Dome, leaving this road on the south side of the ridgeline immediately southwest of the Cleary Summit Subdivision and descend eastward to a straight section of the Steese Highway at a new intersection located approximately 150 feet in elevation below and approximately 2,400 feet southwest of the existing intersection of the Steese Highway with the Pedro Dome / True North Road at the top of Cleary Summit. The route would cross the Steese Highway at a 90 degree angle in a straight stretch of the Steese. On the east side of the Steese Highway the road would climb eastward up the northwest and northern sides of the Twin Creek drainage, around the head of the drainage, and then around the west and south sides of a $2{,}400^{+}$-foot hill before joining Fish Creek Road at the head of the Deadwood Creek drainage.

Alternative 4 -- South Pedro Dome Route / Cleary # 1 / Barnes Creek Road (13.1 miles)

This alternative would leave the existing Pedro Dome / True North Road on the northwest side of Pedro Dome, cross the headwaters of Dome Creek, and wind downward generally south and east for approximately four miles at a six percent grade to cross Granite Creek. It would reach the Steese Highway at a new intersection near the Felix Pedro Monument. The intersection would be at a 90 degree angle in a straight stretch of the Steese. The road then would parallel the Steese to the northeast and cross Goldstream Creek, and then would climb the northwest side of the Deadwood Creek drainage at a six percent grade, turn south around the head of the drainage, and then east and southeast to join the existing Barnes Creek Road near its junction with the GVEA Fort Knox transmission line.

Alternative 5 -- North Pedro Dome Route / Bypass # 2 / Fish Creek and Barnes Creek roads (9.8 miles)

This alternative is the applicant's preferred alternative, and is the same as Alternative 3 except that a new road would be constructed along the north flank of Pedro Dome in lieu of using the existing south Pedro Dome route along the Pedro Dome / True North Road. The route would use the Pedro Dome / True North Road southwest of the Cleary Summit Subdivision for approximately 2,500 feet before descending eastward towards the Steese.

Alternative 6 -- South Pedro Dome Route / South Skoogy / Barnes Creek Road (11.0 miles)

This alternative would leave the existing south Pedro Dome route on the southwest side of Pedro Dome and descend south and east to a crossing of the Steese Highway at approximately mile 18. It then would climb and contour around the northern side of Deadwood Creek, and then head south, east and southeast to intercept Barnes Creek Road.

Alternative 7 -- South Pedro Dome Route / North Skoogy / Barnes Creek Road (12.9 miles)

This alternative would follow the existing Pedro Dome / True North Road on the south side of Pedro Dome, leaving this road on the south side of the ridgeline immediately west of the Cleary Summit Subdivision. It would descend south and then swing sharply northwest and southwest around the head of Skoogy Gulch, generally continuing south to cross the Steese at approximately mile 18 at the same location as Alternative 6. On the east side of the Steese it would follow the same route as Alternative 6.

Alternative 8 -- South Pedro Dome Route / Cleary # 2 / Barnes Creek Road (13.1 miles)

This alternative would follow the same route as Alternative 4 to the west flank of Pedro Dome, then head south with two switchbacks to descend to the Steese Highway on the south side of Steamboat Creek. Crossing the Steese at Steamboat Creek the route would climb steadily eastward in a relatively straight line to Barnes Creek Road.

Preliminary Evaluation - A initial screening of all eight alternatives was made to eliminate those that were clearly inferior, or that did not offer any substantial advantages over other reasonable alternatives.

New road construction / upgrading -- All the options would require varying degrees of new road construction and/or improvement to existing roads. Only Alternative 1 would not require any new road construction. On the west side of the Steese Alternatives 1, 2, 3, and 7 would require reconstruction of most or all of the Pedro Dome / True North Road. Alternatives 4, 6, and 8 would require reconstruction of only approximately 1.5 miles of the same road as far as the southwest flank of Pedro Dome. Alternative 5, the applicant's preferred alternative, would require construction of an approximately 2.5-mile new road around the north side of Pedro Dome.

Alternatives 2, 3, and 5 would require relatively short road construction distances between the Pedro Dome / True North Road and the Steese Highway. Alternatives 4, 6, 7, and 8 would require a considerable distance of new road, much of which would descend to a substantially lower altitude than Alternatives 2, 3, and 5.

On the East side of the Steese Alternatives 2, 3, and 5 again would require relatively short distances of construction before reaching Fish Creek Road.

Alternatives 4, 6, 7, and 8 all would require considerably more new road construction before climbing back to Barnes Creek Road.

On the east side of the Steese, options 1, 2, 3, and 5 would use the existing Fish Creek Road as far as the present junction with Barnes Creek Road. Alternatives 6, and 7 would intersect the road system at approximately the junction of Fish Creek and Barnes Creek roads. From that point all six would require upgrading approximately 1.1 miles of the existing Barnes Creek Road as far as the GVEA Fort Knox transmission line. From this point a new, approximately 2.9-mile road would be constructed at a seven percent grade around the head of Barnes Creek that would descend the Barnes Creek drainage to tie into the top of the existing Fort Knox low grade stockpile. Alternatives 4 and 8 would not require upgrading the approximately 1.1 miles of the existing Barnes Creek Road as would the other six options because they intersect the existing road system near the head of the Barnes Creek drainage.

Alternative 1 -- At 9.2 miles in length this alternative, with alternative 2, would be one of the two shortest routes. It would cost approximately $13.1 million. Ore truck traffic on this route would go through the existing Cleary Summit Subdivision and be closer to the Skiland Subdivision residences than any other alternative. This route would be 40 feet lower in elevation and approximately 330 feet away from the closest Skiland area residence. Light and noise impacts would be highest with this alternative because of its proximity to the local residences. The existing Steese Highway intersection sight distances do not meet DOT/PF standards and pose a significant safety hazard for a grade level crossing. An overpass was considered and discarded as a potential safety hazard due to potential ice build under the overpass and on a curve.

This alternative was dropped early from further consideration because of its close proximity to residents of the Cleary Summit and Skiland subdivisions, and the technical problems associate with a grade level crossing or an overpass.

Alternative 2 -- At 9.2 miles in length this alternative, with alternative 1, would be one of the two shortest routes. It would cost approximately $14.5 million.

Sight distances at a Steese grade level crossing would meet DOT/PF standards, and this route would be approximately 190 feet away from and 40 feet below Alternative 1 on Fairbanks Creek Road, or approximately 520 feet away from the nearest Skiland residence. Light and noise impacts would exist, but would be less than for Alternative 1.

This alternative was dropped because of concern by local residents that there would be too much noise from the route's tie in to Fairbanks Creek Road at its junction with Fish Creek Road almost immediately in front of Skiland residences.

Alternative 3 -- This route would be 10.6 miles in length and cost approximately $16.3 million. The alignment would be approximately 200 feet below and 1,100 feet away from the nearest residence in the Skiland Subdivision and would tie into Fish Creek Road approximately 2,500 feet south of the nearest Skiland residence. In addition to moving the alignment further down slope from the residences, it would travel south and east around a major topographic feature that would further serve to minimize the traffic noise and visual impacts from traffic. This route lessens the grade down slope of the neighboring residences and therefore would lower the noise they would experience due to loaded trucks coming up the grade. The alignments and grades also are laid out to direct vehicle headlights away from Cleary Summit residences. The route would cross the Steese Highway corridor in a straight stretch that would provide reasonable conditions for construction of an underpass with exit and entrance ramps for access to and from the Steese.

Because this route would generate less noise and fewer light impacts than the first two alternatives, because the grades were reasonable, and because the crossing location provided reasonable conditions for construction of an underpass, this alternative was retained for further evaluation.

Alternative 4 -- This 13.1-mile route, at a cost of approximately $20.8 million, would be one of the two longest alternatives, dropping a considerable distance in elevation before climbing back to Barnes Creek Road. The route would pass within approximately 3,700 feet of Fairbanks Creek Road at its closest approach, but would be hidden from view by Skiland residents behind the same large topographic feature as Alternatives 3 and 5 as they approach Fish Creek Road. An estimated 8.3 miles of new road would have to be constructed. While this option would be well removed from the residences on Cleary Summit, it would pass the vicinity of other residences on the hillside behind Pedro's Monument.

Sight distances at the Steese crossing would meet ADOT/PF standards. Due to the limited ability to control and maintain private access in this area, however, crossing the Steese Highway in the vicinity of the Pedro Monument, a major tourist destination, would increase interaction with pedestrian traffic, thereby decreasing safety and increasing liability. This route also would require more extensive engineering and construction to address expansive aufeis problems in the vicinity of the Steese crossing. The sinuous nature of the alignment, and the loss and gain in elevation, would require greater time for ore trucks to make a round trip, thereby substantially increasing operational costs.

This route would have the advantage of little noise or light impacts on Cleary Summit residents, but these impacts would be shifted to residents living near the Pedro Monument.

To retain at least one alternative as a substantial distance from Cleary Summit, this alternative was kept for further evaluation.

Alternative 5 -- This 9.8-mile and approximately $15.3 million alternative is the same as Alternative 3 except that it would use a new road on the north flank of Pedro Dome. This would be somewhat shorter than the south Pedro route and would provide an additional noise and light buffer for residences in the Skoogy Gulch area and below. It also would negate the need to reconstruct the Pedro Dome / True North Road which would increase the visual impacts on Cleary Summit residents. For these reasons, and for those described above for Alternative 3, this alternative was retained for further evaluation.

Alternatives 6 and 8 -- These 11.0- and 13.1-mile alternatives, costing approximately $17.8 million and $20.8 million, respectively, roughly parallel Alternative 4 at a distance from Cleary Summit, and both are relatively similar to that alternative with neither showing any particular advantage over Alternative 4. They are both relatively long, costly, and lose and gain considerable altitude.

Alternative 8 would have the advantage of little noise or light impacts on Cleary Summit residents, but those impacts would be shifted to residents living near the Steese crossing. Minor & Associates (2000b) found that projected noise level increases from potential ore trucks at seven receptors near the proposed Alternative 8 Steese crossing would be similar to those from ore trucks using Alternative 5 on residents at Cleary Summit. Unlike Alternative 5, however, in one case the increase would be significant. Thus, Alternative 8 would only shift, not eliminate, impacts.

Because Alternative 4 was retained for further evaluation and because neither of these alternatives provided clear advantages over alternative 4, both were dropped from further consideration.

Alternative 7 -- This 12.9-mile and approximately $20.8 route differs from Alternative 6 only on the west side of the Steese. It would drop steeply from the Pedro Dome / True North Road to the Steese in the Skoogy Gulch area. It would pass relatively close to residences in the area and cause noise and light impacts with no discernable advantage over other alternatives retained for further evaluation. Therefore, it was dropped from further consideration.

Final Evaluation - Alternatives 3, 4 and 5 were retained for final evaluation. Alternatives 3 and 5 are the same except for their alignment around Pedro Dome. The south Pedro Dome route (Alternative 3) was not considered as favorable as the north route because the existing road does not meet FGMI's road design grades and extensive road reconstruction would be required. While the extent of road construction may be less than the north Pedro route, this route would be in the view shed of receivers along the Steese Highway south of Pedro Dome as well as those on Cleary Summit and reconstruction would increase the size of the visible alignment. This route also would be slightly more expensive than the north Pedro Dome route and would not provide a buffer for residences in the Skoogy Gulch area and below. Also, use of the southern route would mean public users of the road would have to share it with ore trucks for its full length. Thus, with no advantages over Alternative 5, Alternative 3 was dropped.

Comparison of Alternatives 4 and 5 provided clear differences. Alternative 5 would be 9.8 miles long and cost approximately $15.3 million while Alternative 4 would be 13.1 miles long and would cost approximately $20.8 million. The sinuous nature of the alignment for Alternative 4, and the loss and gain in elevation, would require greater time for ore trucks to make a round trip, thereby substantially increasing operational costs, a very important long-term consideration. Alternative 5 provided reasonable conditions for construction of an underpass with exit and entrance ramps for access to and from the Steese while the crossing area for Alternative 4 has potential aufeis problems, a major issue when considering the deep cut for an underpass.

While there were differences between the alternatives for noise and light impacts, none of those impacts for either alternative was considered to be significant. Alternative 4 largely would eliminate noise and light impacts to Cleary Summit residents, but these impacts merely would be shifted to residents living near the Pedro Monument. Regardless of noise impacts from Alternative 4, however, noise impacts were not considered significant for Alternative 5 in any event for the reasons discussed is detail in Sections 4.10 (Noise) and 4.17 (Light

Pollution), respectively. Implementation of mitigation measures discussed in these sections, and in Section 2.3.21 (Mitigation), would substantially reduce these impacts.

Thus, because Alternative 4 would be more costly to build and operate, and it did not offer any clear advantages over Alternative 5, in final evaluation Alternative 5 was selected as FGMI's preferred alternative.

2.2.1.4. STEESE HIGHWAY CROSSING

Four options for crossing the Steese Highway were considered.

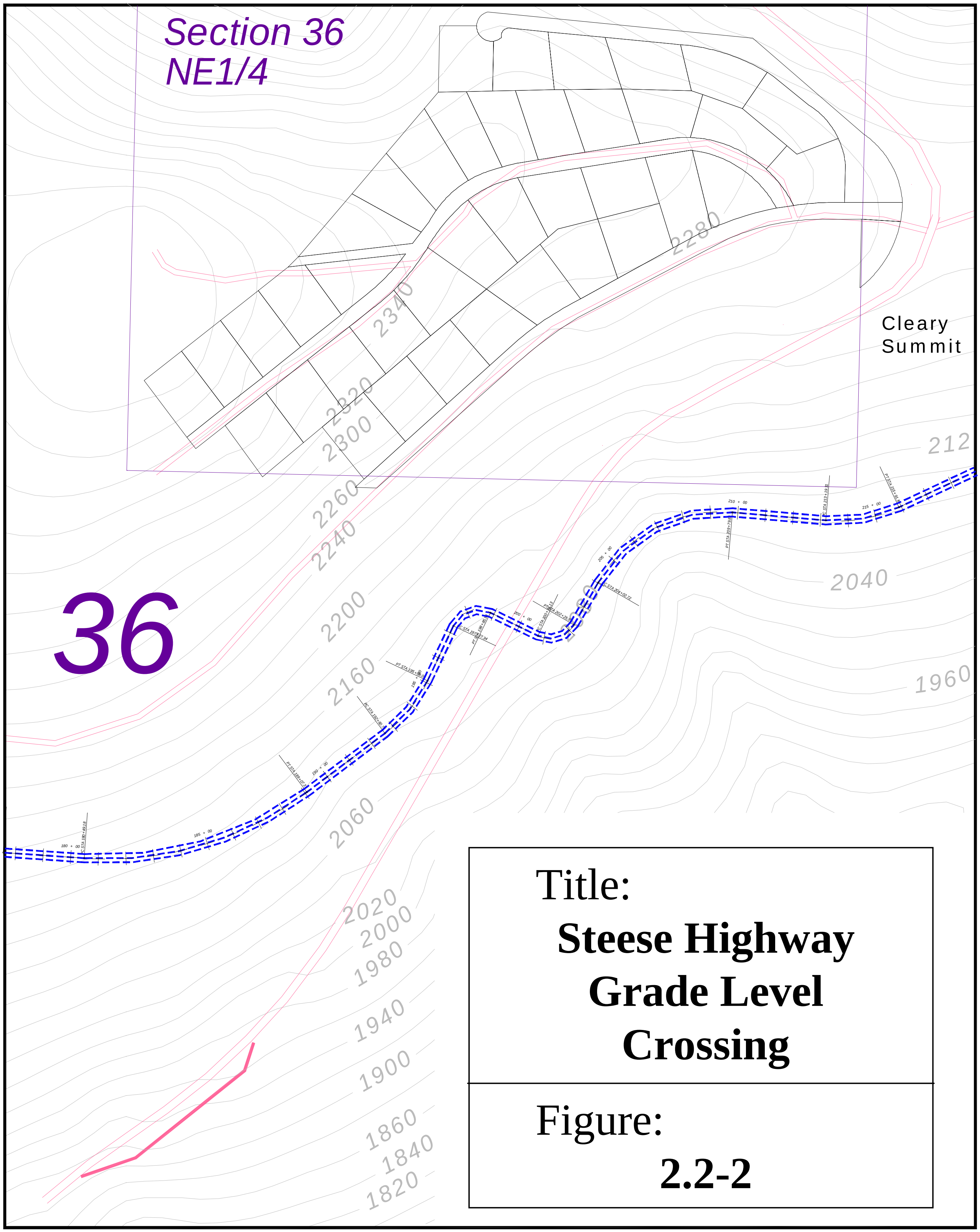
- Grade level intersection
- Tunnel
- Bridge
- Underpass

Grade level intersection -- A grade level crossing by the access haul road would be constructed at approximately right angles to the Steese Highway **(**Fig. 2.2-2). Vehicles on the access haul road approaching the Steese would have to stop and give way to Steese traffic. Sight distances on the Steese in both directions from the intersection would meet DOT/PF sight distance design criteria. Warning lights to alert Steese drivers that ore trucks were approaching the intersection would be installed. On each side of the Steese the haul road would be paved for a minimum of 60 feet to reduce dirt and mud being carried onto the surface of the highway. It would take a fully loaded ore truck approximately 10 seconds to cross the intersection from a full stop. The cost to construct this option would be approximately $300,000.

Tunnel -- A two-culvert tunnel would be constructed under the Steese Highway (Fig. 2.2-3). Traffic on the Steese above would not be affected by traffic through the culverts. Guard rails would be installed on both sides of the Steese. Exits from and entrances to the Steese from the access haul road would be constructed so other mine-related traffic could use the access haul road to access either the True North or Fort Knox mines. The cost to construct this option would be approximately $1.22 million.

Bridge -- A two-lane bridge would be constructed over the Steese Highway **(**Fig. 2.2.4). Traffic on the Steese below would not be affected by traffic on the bridge. Exits from and entrances to the Steese from the access haul road would be constructed so other mine-related traffic could use the access haul road to access either the True North or Fort Knox mines. The cost to construct this option would be approximately $1.81 million.

Underpass - A two-lane underpass would be constructed with the Steese Highway passing overhead on pre-stressed, concrete bridge (Fig. 2.2-5). As with the tunnel and bridge options, traffic on the Steese would not be affected by traffic through the underpass. Exits from and entrances to the Steese from the access haul road would be constructed so other mine-related traffic could use the access haul road to access either the True North or Fort Knox mines. The cost to construct this option would be approximately $900,000.

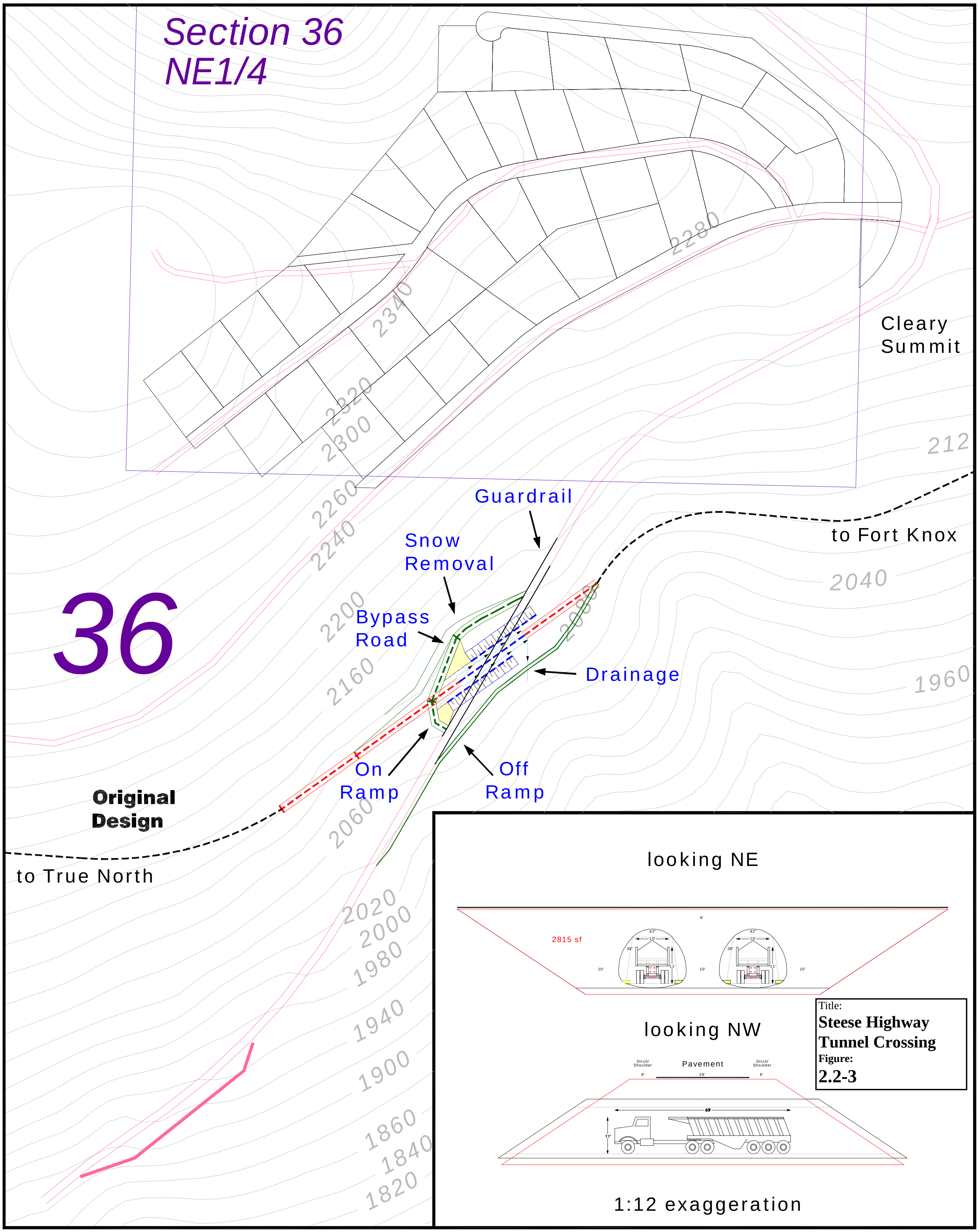


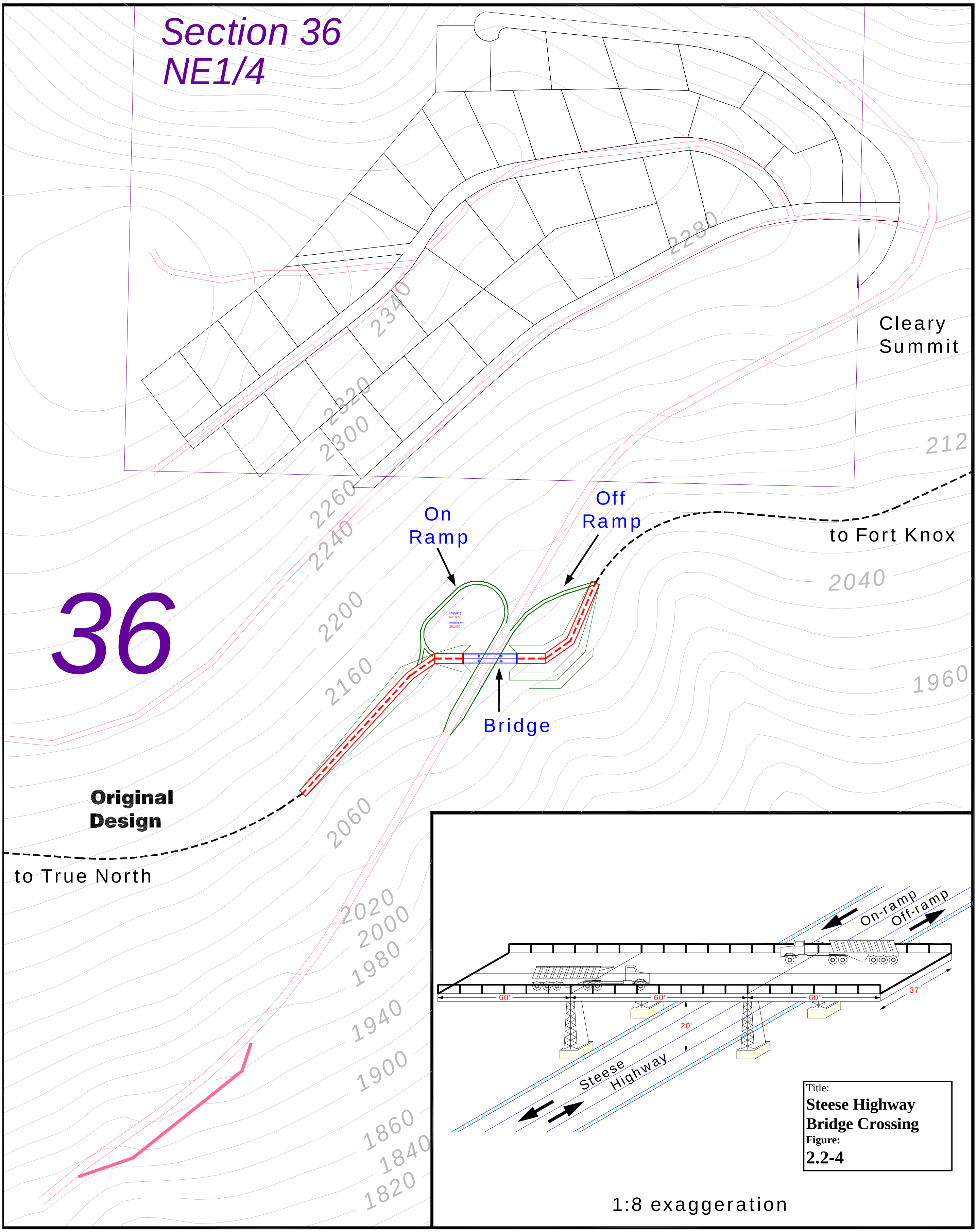
Title:

Steese Highway Grade Level Crossing

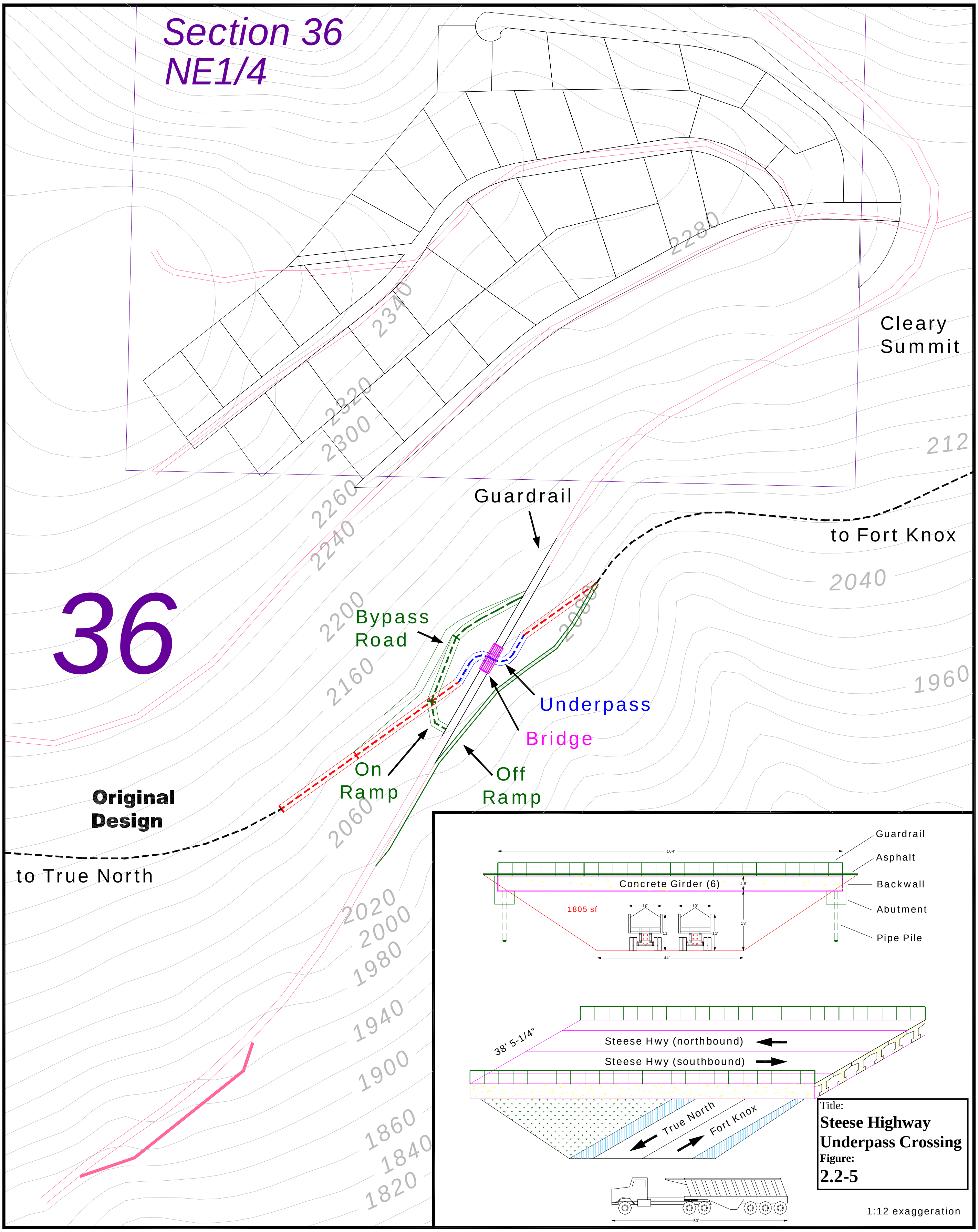
Figure:

2.2-2


Section 36
NE1/4
36
Cleary
Summit
to Fort Knox
Guardrail
Snow
Removal
Bypass
Road
Drainage
On
Ramp
Off
Ramp
Original
Design
to True North
2340
2320
2300
2280
2260
2240
2200
2160
2080
2060
2040
1960
2020
2000
1980
1940
1900
1860
1840
1820
212
looking NE
2815 sf
looking NW
Pavement
1:12 exaggeration
Title:
Steese Highway
Tunnel Crossing
Figure:
2.2-3



Section 36
NE1/4
36
Cleary
Summit
On
Ramp
Off
Ramp
Bridge
to Fort Knox
Original
Design
to True North
2280
2340
2320
2300
2260
2240
2200
2160
2060
2020
2000
1980
1940
1900
1860
1840
1820
212
2040
1960
On-ramp
Off-ramp
60'
60'
60'
37'
20'
Steese
Highway
Title:
Steese Highway
Bridge Crossing
Figure:
2.2-4
1:8 exaggeration


Section 36
NE1/4
36
Cleary
Summit
Guardrail
to Fort Knox
Bypass
Road
Underpass
Bridge
On
Ramp
Off
Ramp
Original
Design
to True North
Guardrail
Asphalt
Backwall
Abutment
Pipe Pile
Concrete Girder (6)
1805 sf
38' 5-1/4"
Steese Hwy (northbound)
Steese Hwy (southbound)
True North
Fort Knox
Title:
Steese Highway
Underpass Crossing
Figure:
2.2-5
1:12 exaggeration

Evaluation - All four options were considered to be environmentally and technically feasible. The tunnel, bridge, and underpass options, however, were substantially more expensive, 400 percent, 600 percent, and 300 percent, respectively, than the grade level option. While significantly more expensive, each of these options addressed the large majority of the public's concerns regarding traffic safety at the grade level intersection. Each option also would provide access from the Steese itself to either the True North or Fort Knox mines, and would allow large vehicles heading to True North a way to access the mine without risking a dead stop on the hill while waiting to turn left at a grade level crossing. There also would be some benefit in operational efficiency if ore trucks did not have to stop at the Steese intersection when traveling in both directions.

Thus, despite the substantially increased cost, the public concern about safety issues related to the grade level crossing were considered of significant importance and the underpass option was selected as FGMI's preferred option.

2.2.1.5. ORE HAULING OPERATION HOURS

The True North Project has been designed to mine and haul ore 24-hours a day to provide the most economical operation. Because of public concerns about the hours of access haulage, options other than the 24-hour basis were considered. Table 2.2-3 shows the net present value (cost) for four access hauling options, using the 24-hour option as base $0. Incremental costs for 20, 16, and 12 hours are shown as $996,000, $1,335,000, and $2,062,000, respectively.

Table 2.2-3
Net present value (cost) for four access hauling options[1]

Haulage Hours	Cost ($)
24	0
20	996,000
16	1,335,000
12	2,062,000

[1] Source: FGMI

Evaluation - As shown, even a relatively small reduction of 4 hours, from 24 to 20 hours, has a cost of just slightly under $1 million. A reduction of 8 hours, from

24 to 16 hours, would cost $1,335,000. This likely would be the minimum reduction local residents would consider as amenable to their lifestyles, if it were to occur at night. Significant mitigation measures have already been taken by FGMI, however, to minimize potential noise and light effects over which local residents have expressed concerns. These are discussed in Sections 2. 3.21 (Mitigation), 4.10 (Noise and Vibration), and 4.17 (Light Pollution). Analyses presented in Sections 4.10 and 4.17 concluded that while there would be some noise and light effects, they would not be significant. Therefore, the costs involved in reducing the hours of access hauling do not appear to be justified by the finding of no significant effects from 24 hours of operation, and thus 24-hour operation was selected as FGMI's preferred option.

2.3 APPLICANT'S PROPOSED PROJECT

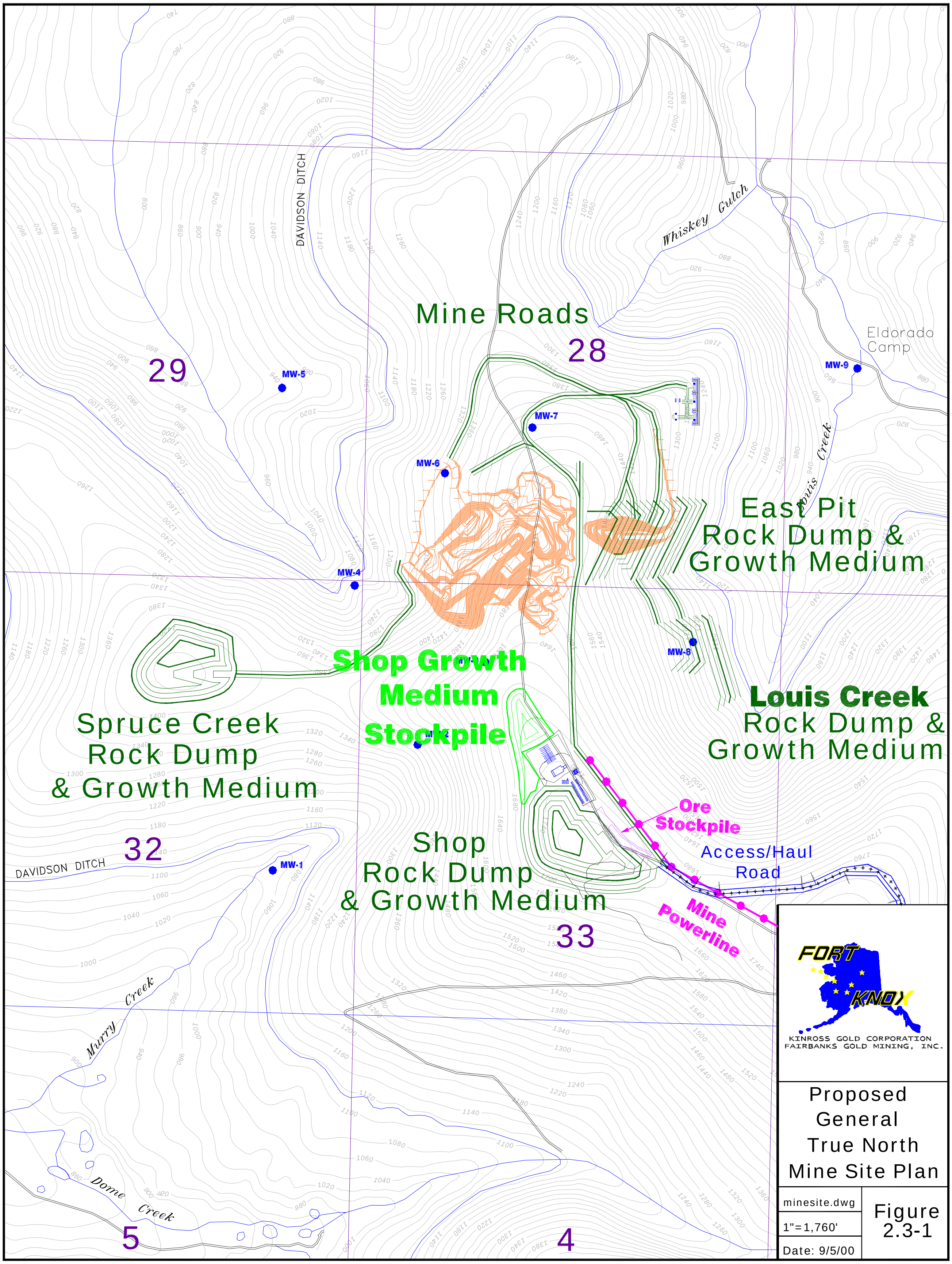
The applicant proposes developing an open-pit gold mine 17 miles northeast of downtown Fairbanks as the raven flies. The project would operate year around, handling approximately 30,000 tons of material per day, with approximately 10,000 tons being trucked daily to the Fort Knox Mill. With approximately 83 percent recovery, the project would be expected to produce approximately 180,000 ounces of gold annually. Mining would be similar to a gravel pit or rock quarry; therefore, no milling or other process facilities would be present on the property. Excavation of the Hindenburg and East pits is projected to begin in the third quarter of 2000 and continue for approximately three years.

Development costs are estimated at between $20 and $30 million. Estimated annual operating expenditures for labor, power, and support services are $14 million. The operational work force would be approximately 100 to 110 people.

The following project description has been taken from the applicant's proposed project description (FGMI, 2000a).

2.3.1 GENERAL SITE PLAN

Figure 2.3-1 shows the proposed general True North Mine site plan. The project would be centered on the Hindenburg and East pits, surrounded by development rock and growth medium storage piles, and an ore stockpile. A maintenance complex would be located south of the Hindenburg Pit and the explosive storage facilities would be located northeast of the East Pit.



Mine Roads
28
29
Eldorado Camp
Whiskey Gulch
DAVIDSON DITCH
MW-5
MW-9
MW-7
MW-6
MW-4
MW-8
MW-1
East Pit
Rock Dump &
Growth Medium
Louis Creek
Shop Growth Medium Stockpile
Louis Creek
Rock Dump &
Growth Medium
Spruce Creek
Rock Dump
& Growth Medium
Ore Stockpile
Access/Haul Road
32
Shop
Rock Dump
& Growth Medium
Mine Powerline
33
Murry Creek
Dome Creek
5
4
FORT KNOX
KINROSS GOLD CORPORATION
FAIRBANKS GOLD MINING, INC.
Proposed General True North Mine Site Plan
minesite.dwg
1"=1,760'
Date: 9/5/00
Figure 2.3-1

2.3.2 ACCESS

Existing road access to the True North Mine is from the Steese Highway, a secondary highway maintained year-around by the Alaska Department of and Public Facilities (ADOT/PF). From the top of Cleary Summit, the existing Pedro Dome / True North gravel road follows around the east, south and west sides of Pedro Dome (Fig. 1.2-2).

To minimize highway crossing danger, and noise, vibration, visual and dust impacts to nearby residents, the applicant's preferred option would construct a new private, exclusive road for trucks hauling ore between the True North Mine and the Fort Knox Mill. Under this proposal, a new, 32-foot running surface road from the True North Mine site would be constructed around the north side of Pedro Dome that would intersect with and use a portion of the existing Pedro Dome / True North Road (Fig. 2.2-1).

This new road would leave the existing Pedro Dome / True North Road on the south side of the ridgeline immediately southwest of the Cleary Summit Subdivision on the Pedro Dome / True North Road and descend eastward to a Steese Highway underpass located approximately 150 feet in elevation below and approximately 2,400 feet southwest of the existing intersection of the Steese Highway with the Pedro Dome / True North Road at the top of Cleary Summit (Fig. 2.2-1).

On the east side of the Steese Highway the road would climb eastward up the northwest and northern sides of the Twin Creek drainage, around the head of the drainage, and then around the west and south sides of a $2{,}400^{+}$-foot hill before joining Fish Creek Road at the head of the Deadwood Creek drainage.

Once the new access haul roads were constructed, both Fort Knox and True North Mine personnel driving to and from work, or between Fort Knox and True North, would use the new access haul roads and would not use the existing intersection at the top of Cleary Summit. In addition to up to 190 round trips per day by access hauling trucks and intermine traffic, other vehicles using the new access road would include a sanitation truck (twice a month), fuel delivery (every other day), potable water truck (twice a week), as well as occasional contractors (e.g., NC Machinery).

FGMI would receive a 10-year, private, exclusive right-of-way from the State of Alaska and a permanent right-of-way from the Mental Health Land Trust (MHLT). Under a use and maintenance agreement with the State, FGMI would bear the costs of construction, liability, and maintenance of the access haul road. When the road were no longer needed for mining purposes, FGMI would either reclaim it or transfer it to another authority at the direction of the landowners, the State of Alaska and the MHLT.

2.3.3 MINING METHOD, EQUIPMENT AND STORAGE

Production rates for the conventional open pit mine would average 10,000 tpd of ore and 20,000 ypd of development rock. Standard drilling and blasting techniques would be used to break the ore. Ore would be drilled using blast hole drills. Blasting generally would occur once a day, five days a week, at approximately 3:00 PM.

Depending on material type, bench heights would vary between 10 and 20 feet, based on production, grade control, and geotechnical considerations. Overall pit wall slopes would vary from 35 to 50 degrees, depending on rock competency.

Haul roads generally would be 80-feet wide with a maximum grade of 8 percent. This would provide for safety by affording separation for mine personnel and equipment. The primary exit from the pit would be on the north and east rims. The exit point of the pit would vary as mining progressed.

The ore stockpile would be located southeast of the pits near the maintenance complex. Ore would be hauled to this location during inclement weather or when ore transport to Fort Knox otherwise were not possible, and stockpiled for reloading into haul trucks for later transport to the Fort Knox Mill.

To the extent possible, rock and materials from other disturbed areas on the site would be used as borrow or fill material in construction of project facilities.

Unusable or excess rock, for which there was no immediate use, would be placed in the rock dumps for possible use at mine closure. Where practical, backfill would occur on previously mined areas as needed. The East Pit would be completely backfilled. Where mine planning and sequencing allow, portions of the Hindenburg Pit would be backfilled.

Topsoil and overburden suitable to establish a viable vegetative cover at mine closure would be temporarily stockpiled until concurrent reclamation activities would begin and/or until final closure. Two 12-hour shifts, seven days a week and 365 days a year, would produce a combined average of 30,000 tpd of ore and development rock.

2.3.4 PITS CONFIGURATIONS

Size and configuration of the Hindenburg and East open pits are presented in Table 2.2-4.

Table 2.2-4
Size and Configuration of True North Open Pits

Characteristic	Hindenburg	East
Pit Ore	6.8 million tons	0.4 million tons
Pit Waste	14.0 million tons	1.5 million tons
Pit Dimension (N-S)	2,000 feet	500 feet
Pit Dimension (E-W)	2,200 feet	1,000 feet
Crest Elevation	1,650 feet	1,530 feet
Bottom Elevation	1,150 feet	1,200 feet
Bench Height	10 to 20 feet	10 to 20 feet
Pit Slopes	35° to 50°	30° to 45°
Haul Road Width	80 feet	80 feet
Maximum Road Grade	8 percent	8 percent

Source: FGMI (2000a)

2.3.5 ACCESS HAULAGE AND PROCESSING

Once blasted, the ore would be loaded using a 13-cubic yard front-end loader. Ore would be transported from the pits to the Fort Knox Mill for processing by approximately nine, 53-foot long conventional highway tractor-trailer trucks pulling 60-ton loads. One round trip, including loading at the pit and dumping at the mill, would take approximately 65 to 70 minutes with trucks traveling at an average speed of approximately 25 to 30 miles per hour. Due to seasonal, weather, and operational variations in haul rates, there would be between 100 and 190 round trips per day. That would equate to a truck passing a given point, in one direction or the other, every 3.75 minutes. During inclement weather, or at other times when it were not possible to move ore to the mill, ore would be stockpiled southeast of the pits by 85- to 100-ton off-road haul trucks (Fig 2.3-1).

The access haul road surface would be approximately 32 feet wide and would follow a new route around the north side of Pedro Dome to the existing Pedro Dome / True North Road. The route would follow the Pedro Dome / True North Road for approximately 2,500 feet, leaving it on the south side of the ridgeline immediately southwest of the Cleary Summit Subdivision and descend eastward to a Steese Highway underpass located approximately 150 feet in elevation below and approximately 2,400 feet southwest of the existing intersection of the Steese Highway with the Pedro Dome / True North Road at the top of Cleary Summit (Fig. 2.2-1).

On the east side of the Steese Highway, the access haul road would climb eastward up the northwest and northern sides of the Twin Creek drainage, around the head of the drainage, and then around the west and south sides of a 2,400+-foot hill before joining Fish Creek Road at the head of the Deadwood Creek drainage and then to the present junction with Barnes Creek Road. From that point approximately 1.1 miles of the existing Barnes Creek Road as far as the GVEA Fort Knox transmission line. From this point a new, approximately 2.9-mile road would be constructed at a seven percent grade around the head of

Barnes Creek that would descend the Barnes Creek drainage to tie into the top of the existing Fort Knox low grade stockpile.

The ore would be processed at the existing Fort Knox Mill, and tailings material would be treated and deposited within the existing tailings impoundment, a zero discharge facility.

While not applicable to the haul trucks which would never drive on the Steese Highway, larger vehicles such as fuel trucks from Fairbanks bound for the True North Mine would turn right off the Steese onto the access haul road, and then turn west and cross under the highway. This would avoid large vehicles having to stop on the Steese Highway itself while waiting for oncoming traffic to pass before turning left off the Steese onto the access haul road to the mine.

The 2,500 feet of the existing Pedro Dome / True North Road over which the ore trucks would travel would be shared with public users. Except for that segment, however, the remainder of the road would remain essentially unchanged and available for public use as at present.

2.3.6 MINE EQUIPMENT

Table 2.2-5 presents a preliminary list of major equipment that would be used in the open pit and for hauling ore to the Fort Knox Mill. Specific numbers of equipment may change after detailed design is completed.

Table 2.2-5

Preliminary Mine Equipment List

Equipment Item	Quantity	Equipment Item	Quantity
Blast hole drill, 45,000-lb pull-down class	1	16G Motor graders	2
992 Wheel Loaders, 13-yard	2	Water trucks	1
Mine haul trucks, 100-ton	3	Backhoe	1
Highway access haul tractor-trailers, 60-ton	9	Lube / service trucks	2
D-10 bulldozers	2	Fuel truck	1
Rubber-tired dozer	1	Maintenance (shop) truck	2
ANFO truck	1	Trailer-mounted light plants	5
Blast hole drill	1		

Source: FGMI (2000a)

2.3.7 SURFACE DISTURBANCE

The mine area "project footprint," as shown in Figure 2.3-1, may be defined as that area at the mine site within which surface disturbance and activities would occur during the project's life, and within which existing conditions likely would be altered. The overall project footprint, as shown in the figure, would be composed of several individual project components.

Historic placer and other mining activities have already disturbed approximately 68 acres within the boundaries of the True North Millsite Lease area. This acreage does not include disturbances caused by roads, trails, historic ditches such as the Davidson Ditch, cabin sites, and other small, localized disturbances.

Table 2.2-6 lists the approximate total and wetlands acreages to be occupied by each of the major project components for the currently projected life of the mine. Some of the previously disturbed areas would be used for True North support facilities. Accurately determining the extent to which a specific component would be built on undisturbed versus disturbed areas is difficult. Therefore, Table 2.2-6 assumes all individual components would occupy undisturbed areas, for a total disturbance of approximately 245 acres in the mine site area. Approximately 66 of those acres would be wetlands.

The portion of the access haul road that would be newly constructed would be approximately 5.7 miles long and a maximum of 100 ft wide. This would result in a maximum disturbance of approximately 69 acres, with approximately 12 of those acres being wetlands (ABR, 2000).

Table 2.2-6
Approximate Area of Surface Disturbance by Project Component

Component	**Area (Acres)**	
	Total Area	**Wetlands Only**
Open pits	67.2	34.7
Development rock dumps & growth medium stockpiles	108.7	
Ore stockpile	1.8	
Maintenance complex	8.0	
Blasting supplies storage	5.2	
Mine site roads	53.8	31.1
Subtotal mine site area	244.7	65.8
Access haul road	69.0	12.0
Total project	313.7	77.8

Source: FGMI (2000a)

2.3.8 WATER SUPPLY

Water for controlling road dust and washing vehicles in the wash bay would come from a well drilled in the vicinity of the maintenance complex. The well would supply approximately 540 gpd. Potable water for the lunchroom and the drying rooms would be trucked in from the Fort Knox Mine and stored in an approximately 30,000-gallon tank. Water used in the wash bay would be recycled, or run through an oil/water separator and then used for dust control.

2.3.9 POWER SUPPLY

Power would be used only at the maintenance complex and not for any mining operations in the pits. Power would be supplied from the Golden Valley Electric Association (GVEA) electrical grid over a 480 V, three-phase powerline that would begin at the Alyeska repeater site on Pedro Dome and generally follow the same alignment as the access road to the maintenance complex (Fig. 2.2-1). It would be approximately 3 miles long, cleared up to a 30-foot width, and have approximately 35 poles spaced approximately 330 feet apart. An approximately 135 kW generator would be installed at the maintenance complex to supply backup power.

2.3.10 FUEL SUPPLY, STORAGE, DISTRIBUTION AND USE

Fuel would be delivered in trucks form various Alaska suppliers to a central fuel storage area in the maintenance complex (Fig. 2.3-2). All fuel tanks would have secondary containment and have leak detection and collection systems. All tanks and dispensing stations would be inside containment areas designed to hold at least 110% of the volume of the largest tank. Dispensing lines would have automatic shutoff devices.

Table 2.2-7 shows the proposed fuel and used oil storage tank sizes. All tanks would be located at the maintenance complex (Fig. 2.3-2).

Table 2.2-7
Proposed Fuel and Used Oil Storage Tank Sizes

Fuel Type	Capacity (Gallons)
2-Diesel fuel storage	20,000
Heating oil storage	10,000
Unleaded fuel dispensing	4,000
Diesel fuel dispensing	4,000
Used oil storage	10,000
Propane (lbs.)	200

Source: FGMI (2000a)

Table 2.2-8 shows estimated fuel use on an annual basis broken down by equipment type.

Table 2.2-8
Estimated annual fuel use by equipment type

Fuel Type	Gallons
Mine equipment (drill, loaders, mine haul trucks)	712,000
Haul trucks	701,000
Support equipment (graders, water truck, lube/service truck, etc.)	426,000
Light vehicles (pickups)	25,000
Blasting	44,000

Source: FGMI

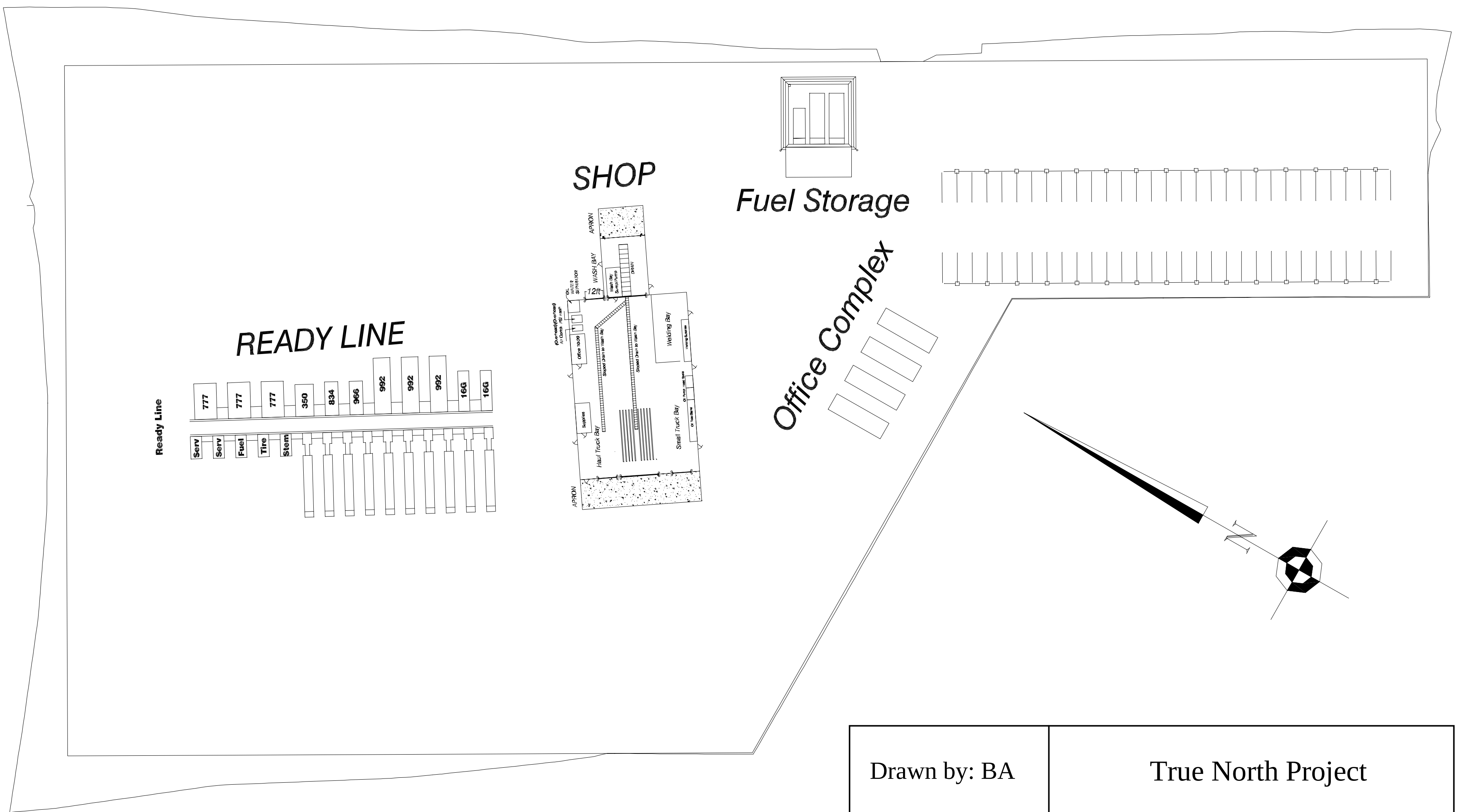
2.3.11 ANCILLARY FACILITIES

The maintenance complex for the mobile mine fleet would be located south of the pits (Figs. 2.3-1 and 2.3-2). The main feature of the complex would be an 80- by 120-foot building that would house a shop, welding bay and a 30- by 40-foot wash. This facility would be used primarily for general preventative maintenance and small repairs while the Fort Knox Mine mobile shop would be used for major over-hauls as needed. An oil water separator would be installed to collect oily sludge from the wash bay prior to leach field disposal.

Two trailers would serve as office buildings and two trailers would function as lineout facilities for mine crews. The lineout facility would be used as a lunch room/conference room and contain bathroom and shower facilities (Fig. 2.3-2). A freshwater holding tank would be placed adjacent to the lunchroom trailers. Other facilities in the maintenance complex would include a truck ready line, fuel storage, and a burn pit,

2.3.12 REFUSE

All wooden pallets and cardboard from blasting supplies would be disposed of in the proposed on-site burn pit. Burning would be conducted approximately once a week year around. During the months May through September, burning would



Drawn by: BA	True North Project
Direction as noted	FIGURE 2.3-2
Date: 9/6/00	Preliminary Maintenance Complex Layout

occur under a permit from the Alaska Division of Forestry. Burn residue (nails, staples, metal banding, etc.) would be disposed of in the FNSB solid waste landfill.

Putrescible wastes (e.g., sack lunch leftovers) would be stored indoors, or would be stored outdoors in closed containers in a fenced area to prevent access by wildlife. All putrescible refuse would be shipped to the FNSB solid waste landfill.

All waste material either listed as or meeting the characteristics of hazardous waste would be shipped off site and disposed of according to applicable state, federal, and local regulations. All used oil filters would be drained and disposed of either by recycling for scrap metal or by shipping to the FNSB solid waste landfill. Used petroleum oils would be stored on site for reuse as fuel for space heaters or transported to Fort Knox for use as fuel in the used oil boilers.

FGMI's waste minimization strategy is to recycle all materials where possible and promote innovative approaches to waste management. Refuse that cannot be recycled would be stored in dumpsters to be disposed of in the FNSB solid waste landfill.

2.3.13 DOMESTIC SEWAGE

A septic tank and leach field system would be used for domestic sewage treatment. Effluent would flow into a common leach field at the edge of the maintenance complex (Fig. 2.3-2).

Sludge from the septic tanks would be removed periodically by a commercial pumping service and disposed of in accordance with approved Alaska Department of Environmental Conservation (ADEC) procedures. Self-contained, vault toilets, regularly serviced by a commercial pumping company, would be used in the open pits and at other remote location in the mine area.

2.3.14 COMMUNICATION

The primary methods of communication at the True North Mine would be on-site telephone systems and radios. The security office at nearby Fort Knox Mine would monitor all radio traffic and coordinate responses to emergency situations as well as routine warnings for blasting and hazardous materials transportation.

2.3.15 EXPLOSIVES STORAGE

All explosives handling and storage would comply with applicable state and federal regulations. All explosives would be stored in appropriate enclosures located off a major haul road just north of the pits (Figs. 2.3-1).

Blasting caps, detonating cord, primers, and boosters would be stored in locked storage magazines. Bulk ammonium nitrate would be stored in two silos containing a combined total of approximately 100-tons. Blasting agents such as bagged ammonium nitrate and fuel oil (ANFO) and water resistant products would be stored in one or more secure trailers constructed for this purpose.

2.3.16 MINE SAFETY

The federal Mine Safety and Health Administration (MSHA) is the regulatory agency with oversight authority for underground and surface mining. The federal Metal and Nonmetallic Mine Safety and Health Regulations and FGMI's corporate practices and policy require mandatory training for all full-time employees.

Emergency response personnel would coordinate fire control and suppression. In addition, all personnel would receive instruction in fire and emergency procedures during their MSHA training.

In addition to an on-site fire truck or fire wagon, mine heavy equipment would be available for fire control and suppression. Available mine equipment would include a 9,000-gallon water truck with pumps and hoses, tracked dozers, graders, and a loader.

Automatic and/or manually activated fire suppression systems would be installed on all heavy equipment. Handheld extinguishers would be installed in all heavy equipment and small vehicles. Buildings would meet state fire suppression codes.

Emergency response personnel would handle medical emergencies. Site personnel would be trained to handle injuries and illness as needed. Trained personnel would, to the best extent possible, be distributed throughout all shifts. The Fort Knox emergency response vehicle and personnel would assist True North, if needed. In addition to on-site personnel and equipment, services of the Interior Ambulance & Rescue Squad and the U.S. Army's Medivac helicopter would be available.

2.3.17 PROJECT MANAGEMENT SYSTEM

FGMI has implemented a successful environmental management system at the nearby Fort Knox Mine since operations began there in November 1996. A similar plan, designed to meet all applicable regulatory requirements, would be adapted to the True North project. This project management system would include:

- Project Description
- Reclamation Plan
- Storm Water Runoff Pollution Prevention Plan
- Spill Prevention Control and Countermeasure Plan (SPCC)
- Waste Disposal Procedure Pocket Manual
- Monitoring Plan (including surface and ground water quality and development rock and ore characterization)

2.3.18 ENVIRONMENTAL INCIDENT RESPONSE

FGMI environmental services personnel would coordinate control, containment, and cleanup of all on-site hazardous and non-hazardous material spills (petroleum products and chemicals). For off-site spills, the responsible trucking company and/or product manufacturer would coordinate the initial response and cleanup.

The project would be required to have an updated spill prevention, containment, and countermeasure (SPCC) plan pursuant to EPS regulations.

2.3.19 WILDLIFE PROTECTION

No hunting, fishing, or trapping by FGMI employees or the public would be permitted within the True North project lease boundaries to ensure the safety of employees and the public.

Feeding of animals by workers would be strictly prohibited. Employees would receive education about the personal dangers involved in such feeding, and the fact that animals often end up being shot when they lose their fear of people and become dangerous. Violations would be grounds for disciplinary action as they have been at the Fort Knox Mine.

2.3.20 MINE CLOSURE AND RECLAMATION PLANS

Although there would be no processing facilities at the True North site, and mining would be similar to that of a gravel pit or rock quarry, the True North project is subject to the Alaska Reclamation Act and its implementing regulations.

FGMI, with the concurrence of state resource agencies, has designated the post-mining land use as wildlife habitat and recreation consistent with the Tanana Valley Basin Management Plan.

Reclamation is a progressive, long-term process. Planning for reclamation began during conceptual design of the mine. For the area and component-specific reclamation plans, which will govern actual reclamation activities, a separate, comprehensive True North Project Reclamation Plan has been developed, the *True North Project Reclamation Plan* (FGMI, 2000b), which presents a detailed plan for all stages of project reclamation. This section of the environmental evaluation document presents only a basic summary of the plan, and the reader is referred to the reclamation plan for more complete information. All measures described in the reclamation plan would be included in the COE Section 404 permit by reference, and would become enforceable requirements of the permit.

In general, the objectives of reclamation are:

1) Stabilization and protection of surficial soil materials from wind and water erosion;
2) Stabilization of steep slopes through contouring and leveling to provide rounded land forms and suitable seedbeds;
3) Establishment of long-term, self-sustaining vegetation communities through reseeding and/or promotion of natural invasion and succession. Achieving these objectives will be in the form of success with concurrent reclamation of disturbed areas.

Return the site to a stable and environmentally sound conditions that meet the designated land use prescribe by the Tanana Basin Area Plan of Wildlife Habitat and Recreation.

The access haul road, upon final inspection and concurrence by the appropriate state and local agencies, would have the rights-of-ways issued by the State of Alaska and MHLT transferred to either the state or the FNSB.

2.3.21 MITIGATION

The term "mitigation" can have several meanings in a NEPA review process. The following presents meanings under Council on Environmental Quality (CEQ) guidelines, in priority order:

a) Avoiding the impact altogether by not taking a certain action or parts of an action
b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation
c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment
d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action
e) Compensating for the impact by replacing or providing substitute resources or environments

Mitigation by avoiding impacts altogether, as in (a) above, has been incorporated extensively throughout the project's planning process through alteration or elimination of options or designs to avoid substantial impacts. Three forms of mitigation—(b) minimizing impacts, (c) rectifying impacts through repair, and (d) eliminating impacts over time—are described elsewhere in this Section 2.3 (Applicant's Proposed Project) and in Chapter 4 (Environmental Consequences).

Without these mitigate measures, or environmental safeguards, which have been incorporated in the True North project plans for design, construction, and operation, there could have been substantial adverse environmental impacts. Following are brief descriptions of the mitigation measures that summarize the major environmental safeguards that would be used in project development.

Minimizing Surface Disturbance. Existing roads would be used for access where possible, commensurate with minimizing impacts to local residents from access hauling impacts.

Road construction or upgrading would use stripped overburden, development rock, where feasible and economic, thus opening fewer new borrow sources.

The preferred access route for the power line would largely follow the access roads.

Sediment and Erosion Control. Only areas that would be directly affected by project activities would be cleared. Vegetation would be restored in disturbed areas not subject to vehicle use or scheduled for future use or disturbance.

Best management practices (BMP) would be used to control non-point erosion during construction and active mining. Activities would be designed to minimize redisturbance during reclamation and active reclamation. The BMPs would be consistent with the measures and practices identified in *Storm Water Pollution Prevention for Industrial Activities* (Environmental Protection Agency [EPA], 1992).

When land is cleared, smaller trees and brush would be chipped or mulched and added to the topsoil as an amendment. Salvageable timber, if any, would be cut, decked, and made available to the public free of charge, or disposed of otherwise in coordination with the Alaska Division of Forestry.

Cuts and fills for access and service roads would be designed to prevent erosion. These areas, as well as those cleared adjacent to road surfaces, would be revegetated for stabilization and erosion protection. To prevent channeling and washout, road surfaces would be augmented with crowns, ditches, water barring, and culverts to control runoff. Where appropriate, berms, settling ponds, and sediment traps would be used. In general, storm-water BMPs would be used if a potential for sediment-laden water to reach natural surface drainages existed.

Embankment slopes would be graded and revegetated to prevent erosion.

Precipitation runoff from construction sites would be channeled into temporary settling ponds to minimize sediment from reaching streams.

Wetlands. All mitigation procedures listed above for minimizing surface disturbance, and for sediment and erosion control, also would mitigate wetlands impacts. In addition, several specific wetlands mitigation procedures would be implemented.

New road construction would seek to avoid wetlands where feasible.

Waste piles would be graded during the life of the project to form steep slopes and short flow paths that would minimize infiltration and erosion.

Revegetation would be initiated on rock dumps, borrow site roads, and waste material areas as the project progressed. To minimize erosion, mulching would be included in the revegetation process where appropriate.

During construction, storm-water BMPs, such as hay bales, silt fences, and sediment traps in weir structures, would be implemented in active areas where storm water or melt water would be directed into wetlands.

Water Quality. The project would be a zero-discharge facility.

Fuel tanks would be in containment structures capable of holding at least 110 percent of the volume of the largest tank.

All hazardous wastes would be shipped off the site and disposed of according to applicable state and federal regulations.

Used oil would be used on the site for space heaters, or would be transported to Fort Knox for use as fuel for the used oil boilers.

Rock dumps and piles of overburden and growth medium would be stabilized, reseeded as necessary, and maintained to minimize wind and water erosion and compaction until needed during reclamation.

Test trials would be conducted at the project site during the operational phase to identify appropriate grassy and woody plant species suitable for permanent revegetation during reclamation.

Wildlife. All putrescible refuse would be disposed of in the FNSB landfill.

Employees and the general public would not be allowed to hunt, trap, or fish within the project lease boundary.

Employees would be prohibited from feeding wildlife and would be educated about the personal dangers in such feeding (for example, bear-human contacts, and rabid foxes).

Air Quality. Standard industry procedures would be used to minimize generating regulated pollutants. These would include the following:

Water trucks would be used to control dust in the mine pits and on gravel roads in summer, and in winter snow would be pushed onto roads and compacted.

Chemical additives would be used when necessary to control road and pit dust.

The stockpiles for development rock and overburden would be stabilized and re-vegetated as soon as practicable after they were created to minimize fugitive dust.

Noise. Operational noise levels would be maintained below the FHWA roadway noise abatement criterion of 67 dBA at the exterior of residences.

The access haul route to the Fort Knox Mill has been engineered to minimize grades to reduce engine noise.

All engine-powered equipment would have mufflers installed according to the manufacturer's specifications and comply with pertinent equipment noise standards of EPA.

When possible, engine-powered equipment, such as loaders, haul trucks and dozers, would be placed behind existing berms or ore stockpiles.

When possible, idling equipment would be turned-off.

Stationary construction equipment would be located as far from nearby noise-sensitive properties as possible.

Mine development would be used as shielding for the loudest activities where possible.

Blasting typically would occur only once per day, five days a week, normally around 3:00 PM.

Blasting would be conducted to keep noise levels well below EPA-recommended community annoyance criteria.

Nearby residents would be notified of major changes in blasting schedules.

Cultural. Baseline studies of potentially important historical and cultural sites have been conducted and eligibility of sites for the National Register of Historic Places has been determined.

Visual. Reclamation procedures, to the extent reasonable, would contour and revegetate the mine pit, rock dumps, and piles of overburden, and growth medium to blend in with the natural setting.

The access haul road would be built as narrow as possible. Clearing limits would be constrained and cut and fill minimized. This would reduce the reflective qualities of soils and snow, reducing the contrast with soils. This also would allow the retention of vegetation in order to capture light from headlights in the winter.

Light pollution. Fugitive light at the mine site would be minimized by covering lights with reflective tops to redirect light to the ground.

The access haul route to the Fort Knox Mill has been engineered to use direction and slope to minimize the time truck lights would shine towards these aurora viewing establishments. Most of the time the lights would shine directly into the hillside below, and not into, the residences.

Consideration would be given for reducing glare from headlights. Vehicles would either use a yellow fixture in the headlamps, or consideration would be given to using only parking lights at night because it will be a private road. Roadway markers with reflective tape could be used to delineate the edge of the roadway.

This issue would have to be balanced with concerns for moose on the roadway and the danger they could pose.

Possible use of shields or hoods would be considered to further reduce light escapement by focusing lights on the road right-of-way.

2.3.22 TRAFFIC

All Fort Knox and True North mine traffic coming from and leaving for the Fairbanks area would use the new access haul route rather than Fairbanks Creek or Pedro Dome roads, thus reducing traffic by approximately 348 vehicle-trips per day on Fairbanks Creek Road.

While not applicable to the ore haul trucks which would never drive on the Steese Highway, larger vehicles such as fuel trucks from Fairbanks bound for the True North Mine would turn right off the Steese onto the access haul road, and then turn west and cross under the highway. This would avoid large vehicles having to stop on the Steese Highway itself while waiting for oncoming traffic to pass before turning left off the Steese onto the access haul road to the mine.

During project construction, trucks carrying materials to the project site would be scheduled to avoid peak traffic periods.

Fugitive dust from truck traffic on gravel roads would be minimized by such methods as water spray or chemical treatment.

Workers would be encouraged to car pool for transportation to the project site.

2.3.23 MONITORING

Although not required by any permit, FGMI intends to continue quarterly water quality sampling of its nine groundwater wells at the True North site. Ongoing ore and waste characterization would continue through the True North project mine life to verify any potential for acid rock drainage or the mobilization of other constituents.

By the terms of its waste disposal permit for tailings from the Fort Knox Mill, FGMI will monitor water quality parameters on a regular basis with the results reported to ADEC.

2.3.24 No-Action Alternative

In the no-action alternative, the True North project would not be developed. This alternative may be used as a baseline for comparison with the other alternatives.

The no-action alternative would result from denial of at least one, or perhaps more, of the federal or state permits necessary for project development. It also could result if the project applicant chose not to develop the project.